Fluorescence studies on new potential antitumoral 1,3-diarylurea derivatives of thieno[3,2-*b*]pyridines in solution and in nanoliposomes

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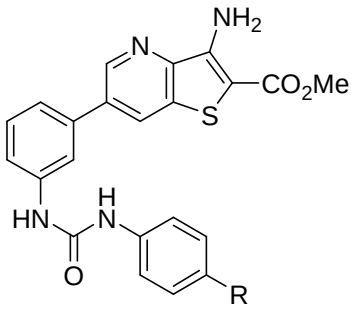
Nanoliposomes are among technological delivery developments for chemotherapeutic drugs in the treatment of cancer. This technique can potentially overcome many common pharmacologic problems, such as those involving solubility, pharmacokinetics, in vivo stability and toxicity.[1,2] In this work, the fluorescence properties of new potential antitumoral 1,3-diarylureas in the thieno[3,2-*b*]pyridine series, **1a-c**, were studied in solution and in lipid membranes of different composition and charge, either cationic, neutral (zwitterionic) or anionic. Nanosized liposomes were prepared using egg yolk phosphatidylcholine (Egg-PC) dioctadecyldimethylammonium bromide (DODAB), dipalmitoyl phosphatidylcholine (DPPC) and dipalmitoyl phosphatidylglycerol (DPPG), with or without cholesterol (Ch). Compounds **1a-c** present very reasonable fluorescence quantum yields in different solvents ($0.10 \leq \Phi_F \leq 0.30$) and exhibit a red shift in emission with increasing solvent polarity. However, they are not fluorescent in protic solvents (like alcohols and water).



1a R = H
1b R = OCH_3
1c R = CN

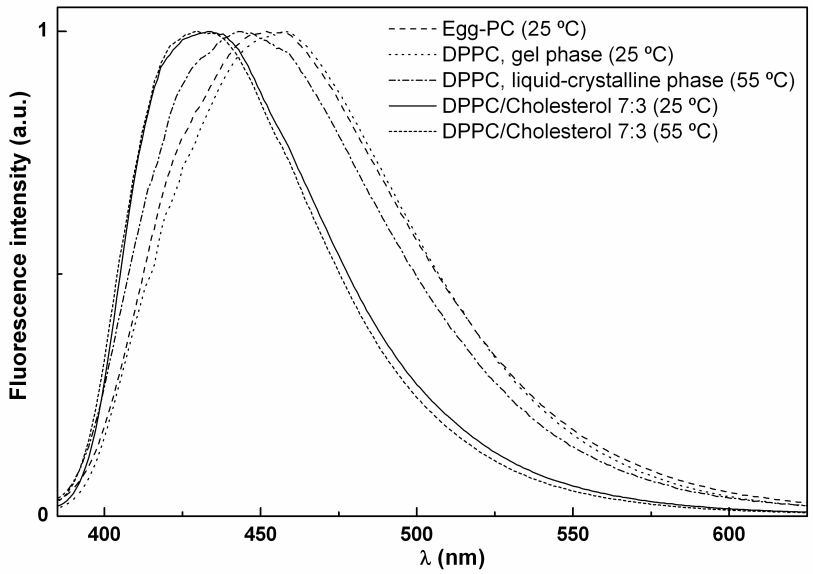


Figure 1. Normalised fluorescence spectra of compound **1a** in lipid membranes of DPPC, Egg-PC and DPPC/Ch 7:3.

All compounds exhibit reasonable fluorescence emission when incorporated in lipid membranes (Figure 1), indicating that they can be transported in the hydrophobic region of the lipid bilayer. Fluorescence anisotropy measurements of the compounds incorporated in nanoliposomes show notable anisotropy variations when fluidity increases above the melting transition temperature or by addition of cholesterol. These results may be important for future drug delivery applications of these potential antitumoral compounds using nanoliposomes as drug carriers.

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